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MAYAGUEZ 28, 49, and 63  
THREE SUGAR CANE VARIETIES COMMERCIALLY RESISTANT TO MOSAIC.

By Robert L. Davis, Agronomist.

Trials with Mayaguez Sugar Cane Varieties during 1931 and 1932.

## INTRODUCTION.

Among the seedlings of POJ 2725 and SC 12/4 three were chosen, Mayaguez 3, 7, and 42 for preliminary trials because they were apparently immune to mosaic and showed pronounced growth vigor. In addition to these a number of other seedlings were included in 1931 and 1932 trials which were slightly susceptible to mosaic but later on proved commercially resistant. The more promising of these appear to be Mayaguez 28, 49 and 63. The object of the present progress report is to give the results of variety trials and to indicate the desirability of the inclusion with Nos. 3, 7, and 42 of these three additional seedlings in a larger number of variety trials under varied upland and lowland conditions.

## RESULTS OF 1931 PRELIMINARY TRIALS.

Preliminary trials were conducted in 1931 with Centrals Aguirre, Fajardo, Guanica, and in the San German valley. On account of the limited supply of cuttings, only two row plots, 1/40 to 1/60 acre in area, were used and each variety was planted in duplicate only. The sugar yields were based on hand mill analyses of 75 to 150 lb. samples of cane. The outstanding result as shown in Table No. 1, in which the yields of adjoining plots of BH 10/12 are given directly below the corresponding Mayaguez seedling, is the superior cane production of the majority of the Mayaguez seedlings. With the exception of the Aguirre experiment, the estimated sugar yields of the Mayaguez seedlings compared favorably with those of BH 10/12.

Conclusion: Mayaguez 3, 7, 42, and 63 are worthy of trials on a larger scale with the necessary number of repetitions.

Table 1. - ESTIMATED YIELDS OF CANE IN COOPERATIVE PRELIMINARY FIELD TRIALS WITH CENTRALS AGUIRRE, FAJARDO, AND GUANICA.

Where grown, age of plant and variety	Yield of cane per acre	Proportion of sugar	Yield of sugar per acre
			Tons
<b>AGUIRRE: Gran cultura plantings 17 months old:</b>			
Mayaguez 7	74.00	10.31	7.63
B.H. 10/12	57.30	13.47	7.71
Mayaguez 42	77.80	11.78	9.15
B.H. 10/12	62.60	13.14	8.23
Mayaguez 3	58.35	11.97	6.98
B.H. 10/12	47.40	14.61	6.93
Mayaguez 63	92.80	12.90	11.52
B.H. 10/12	65.40	12.27	8.44
<b>FAJARDO: Primavera plantings 15 months old:</b>			
Mayaguez 42	69.35	13.55	9.36
B.H. 10/12	58.30	13.55	7.90
Mayaguez 3	64.85	12.15	7.86
B.H. 10/12	56.70	13.40	7.60
<b>FILIAL AMOR: Gran cultura plantings 18 1/2 months old:</b>			
Mayaguez 7	(4)	(4)	(4)
Mayaguez 42	(4)	(4)	(4)
Mayaguez 3	60.80	14.10	8.57
B.H. 10/12	54.50	11.30	6.16
Mayaguez 63	81.60	---	--
B.H. 10/12	59.00	---	--
Mayaguez 49	89.50	15.45	13.81
B.H. 10/12	63.20	14.53	9.23

Note: (4) These plots were cut for seed prior to harvest.

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Table 1 - (Continued)

CONSTANCE: Primavera plantings  
15 months old:

Mayaguez 7	46.90	14.25	6.68
B.H. 10/12	39.20	15.47	6.17
Mayaguez 42	47.70	15.01	7.32
B.H. 10/12	44.70	15.14	6.77
Mayaguez 13	49.10	15.56	7.76
B.H. 10/12	40.90	16.14	6.61
Mayaguez 44	46.60	15.57	7.25
B.H. 10/12	56.60	12.61	6.97
Mayaguez 61	59.30	14.40	8.55
B.H. 10/12	50.40	14.28	7.18
Mayaguez 83	57.50	---	---
B.H. 10/12	38.30	---	---

The productions of adjoining plots of BH 10(12) are given directly under those of the respective Mayaguez seedling. In each experiment two plots of each variety 1/40 to 1/60 acre in area were grown. Sugar yields are based on hand mill analyses of 75-150 lb. samples.

THE 1932 VARIETY TRIALS.  
CENTRAL COLOSO GRAN CULTURA VARIETY TRIAL. -(UNDER IRRIGATION) <sup>§</sup>

The Coloso Gran Cultura variety trial was harvested April 1, 1932, when 22 months old. Each variety was repeated 8 times in two row plots, 1/20 acre in area. The spacing was 4 1/2 feet between rows, and 3 cuttings per hole, with the holes one meter apart in the row. This open spacing and the narrow plots gave some advantage to the more prolific varieties, POJ 2878, POJ 2725, Mayaguez 28 and Mayaguez 49. As shown in Table No. 2, Mayaguez 28 equalled BH 10(12) and POJ 2878 in both cane production and tons of sugar per acre. POJ 2725 was inferior to Mayaguez 28 in sugar production on account of a lower percentage of sugar yield. Mayaguez 49 ranked fourth, exceeding POJ 2725 in sugar production on account of its very high percentage of sugar yield. Although PR 826 ranked even with POJ 2725, its marked susceptibility to mosaic will prevent the growing of it in this district. Mayaguez 3, 7, 42, and 49 were all inferior to No. 28 in tons of cane as well as in tons of sugar per acre. All of them were very high in sugar yield especially Nos. 42 and 49, both of which exceeded BH 10(12) in this particular. POJ 2724 and PR 801 were definitely inferior to all other varieties in both sugar yield and cane production.

Conclusion: - Mayaguez 28 and 49 planted in gran cultura will approach BH 10(12) and POJ 2878 in sugar production on Coloso irrigated lowland. Additional trials should be conducted with a normal 1 by 4 1/2 ft. spacing per cutting to confirm this conclusion. POJ 2714 and PR 801 are not adapted to Coloso irrigated alluvial soils.

<sup>§</sup>These variety trials were planned and the harvest was conducted through the cooperation of Mr. Francisco Colón Moret, Field Superintendent, Central Coloso.

1932 CROP - COLOSO GRAN CULTURA VARIETY EXPERIMENT.  
AVERAGES OF 8 PLOTS PER VARIETY, 1/20 ACRE EACH.  
IRRIGATED LOWLAND.

Planted Sept. 24, 1930 - Harvested April 9, 1932 - Age: 22 Months.

Variety	Tons of cane per acre	Percent sucrose	Percent purity	Percent sugar yield	Tons of 96% sugar per acre
POJ 2878	50.71 ± 3.89	17.34	84.89	13.42	6.824 ± .492
Mayaguez 28	50.35 ± 3.36	17.24	85.82	13.41	6.761 ± .481
B.H. 10(12)	49.93 ± 3.21	17.45	85.13	13.52	6.755 ± .503
Mayaguez 49	43.93 ± 5.17	17.81	87.39	13.95	6.122 ± .562
POJ 2725	50.50 ± 4.15	15.47	83.39	11.87	6.004 ± .665
P.R. 826	51.00 ± 4.34	15.31	83.89	11.81	6.014 ± .478
Mayaguez 3	40.37 ± 5.07	17.25	84.76	13.21	5.330 ± .677
Mayaguez 42	38.27 ± 6.32	17.76	86.94	13.90	5.313 ± .880
Mayaguez 7	40.12 ± 5.04	17.05	83.90	13.11	5.275 ± .561
S.C. 12/4	38.19 ± 3.81	17.12	85.48	13.30	5.086 ± .521
P.R. 801	32.80 ± 5.00	15.52	82.32	11.67	3.848 ± .724
POJ 2714	29.07 ± 4.89	14.31	76.26	10.48	3.065 ± .638

Applications	Kind of fertilizer	No. of lbs. per acre	Cane age in months when applied
1st.	13 - 10 - 12	500	2
2nd.	Ammonium sulphate	600	3 1/2



Weather was very dry and no irrigation water was applied during the 3 months prior to harvest. Soil was of a loose alluvial type. Plots were 2 rows wide with 4 1/2 ft. between the rows. Three cuttings were planted per hole and the holes were spaced one meter apart along the row.

## VARIETY

§ 1932 CROP CENTRAL PAGAN GRAN CULTURA/EXPERIMENT.  
(IRRIGATED LOWLAND)

Harvested at 16 to 17 months.

The variety trial at Central Pagán (Hacienda Esperanza) was harvested December, 1931 to January, 1932. The plots were 8 rows wide with rows spaced 4 1/2 feet apart and cuttings spaced one every foot in the row. The results are not conclusive as there were only 2 plots of Mayaguez 3 and only one of Mayaguez 42. The three plots were, however, all superior to POJ 2725 and the results are of some agronomic value since the production of POJ 2725 was very uniform in all parts of the field where the trial was conducted. Mayaguez 42, harvested December 30, 1931, produced 85 tons of cane and 6.93 tons of sugar per acre in contrast with POJ 2725 which produced 71.88 tons of cane and 6.13 tons of sugar per acre on an adjoining .14 acre plot. Mayaguez 3 harvested January 26 averaged 78.49 tons of cane and 7.416 tons of sugar per acre on two .38 acre plots, in contrast with POJ 2725 which averaged 70.19 tons of cane and 5.46 tons of sugar per acre on two adjoining plots of the same size. The sugar yields of all three varieties were very low due to some local disturbing factor. The sugar productions of Nos. 3 and 42 are not comparable owing to a month's difference in harvest time.

Conclusion: - Both Mayaguez 3 and 42 are apparently well adapted to the irrigated lowlands of Central Pagán. Additional trials containing four or more replications are needed to confirm this. Prior to obtaining data on the ratoon crops of variety trials, however, extensive plantings of these varieties should not be made.

§ Experiment in cooperation with Mr. Riff, In Charge of Experiments,  
Russell and Company, Central Pagán, Añasco, Puerto Rico.

The following primavera results on irrigated loose alluvial lowland soil at Hacienda Trinidad of Central Pagán indicate that Mayaguez 42 will give good sugar yields and compare well with POJ 2878 in sugar production in the Añasco valley. Mayaguez 42 on .18 acre harvested March 4, 1932 when 14 months old produced at the rate of 72.5 tons of cane and 9.243 tons of sugar per acre in comparison with a .51 acre plot of POJ 2725 with a production of 57.74 tons of cane and 7.117 tons of sugar per acre. The production of a .53 acre plot of POJ 2878 adjoining that of POJ 2725 was about the same as for the latter, 56.41 tons of cane and 6.934 tons of sugar per acre. Mayaguez 42 gave a normal juice analysis of 16.4 per cent sucrose and 84.6 per cent purity.

Measurements taken in the 1933 gran cultura experiments of Central Pagán where 4 plots, one-eighth acre each, of Mayaguez 42 are checkerboarded with BH 10/12 indicate the same superiority for this variety over BH 10(12) as that shown over POJ 2725 in 1932. No. 42 averaged 10 inches taller than BH 10(12) when 8 months old. This statement is based on measurements of 50 canes of each variety.

## CENTRAL AGUIRRE PRIMAVERA TRIAL. §

At Hacienda Josefa, Central Aguirre, two 1/4 acre plots each of Mayaguez 3, 7, 42 and 63 were grown alternating with plots of BH 10(12). Mayaguez 63 averaged 54.2 tons of cane per acre which was 4.5 tons more than adjoining plots of BH 10/12. Mayaguez 42 gave about the same tonnage as BH 10(12) while Nos. 3 and 7 were inferior to BH 10(12). The sugar yields of BH 10(12) were, however, superior to those of the Mayaguez seedlings. These data indicate that Mayaguez 3, 7, and 42 are not as well adapted as No. 63 to Aguirre conditions. Mayaguez 63 appears worthy of additional trials in that district.

§ This variety trial was planned and the harvest was supervised through the cooperation of Mr. Mabyn S. Baker, Agronomist, Central Aguirre Sugar Company.

## GENERAL FIELD TRIALS WITH MAYAGUEZ 3, 7 and 42.

That Mayaguez 3, 7, 42 will develop very satisfactory sucrose contents is indicated by the following results secured in the Añasco and San Germán valleys during the 1932 grinding season. On the farm of Mr. Esteban Ferrer near Rincón, 40 tons of Mayaguez 3 ground in February gave 16.55 per cent sucrose and 84.3 per cent purity, and 15 tons of Mayaguez 7 gave 17.00 per cent sucrose and 84.9 per cent purity. At Hacienda Imiza, San Germán valley district, of Russell & Co., 4.48 acres of Mayaguez 7, 11 1/2 months old primavera, cut April 25 - May 1, averaged 37.47 tons per acre with 17.5 per cent sucrose and 85.3 per cent purity.



On loose sandy loam soil of the farm of Mr. Francisco Murati one half acre of Mayaguez 42 primavera harvested in April, 1932, produced 46 tons of cane per acre with a sucrose of 16.5 per cent and a purity of 85 per cent in comparison with 7.16 acres of POJ 2878 in the same field which produced the same cane tonnage but with 15 per cent sucrose and 79 per cent purity.

#### GENERAL FIELD TRIALS WITH MAYAGUEZ 28.

Mayaguez 28 has given good results on loose alluvial soils both in the San Germán valley and in the Central Coloso gran cultura variety trials. It has also made excellent growth on the porous clay soils at Isabela. Mill trials from the Isabela district are awaited with much interest.

In the San Germán valley plantings of Central Igualdad and of Mr. Alfredo Ramírez, the following results were obtained on cane grown without irrigation:

One acre of Mayaguez 28, 12 months old primavera of the 1931 crop on the Isabela Josefa, yielded 42 tons with a sugar yield of 14.78 per cent. The production of 25 acres of primavera of the 1931 crop averaged 35 tons per acre or 10 tons more than adjoining fields of BH 10(12) and Java 36. On loose sandy loam at Colonia Sambolin 18 months old gran cultura harvested February 4, 1932, gave from 1 acre of Mayaguez 28 a production of 88 tons of cane with 15.37 per cent sucrose and 81.86 per cent purity in comparison with 1.97 acres of POJ 2878 which yielded 72 tons of cane per acre with 12.8 per cent sucrose and 79.0 per cent purity; this was flat lowland which was flooded over several times in the fall of 1931. On loose alluvial lowland soil at Colonia Dávila, in 17 months old gran cultura plantings harvested January 10, 1932, .90 acre of Mayaguez 28 yielded at the rate of 56.1 tons per acre with 14.4 per cent sucrose and 84.6 per cent purity in comparison with 1 acre of POJ 2878 which yielded 59.2 tons of cane with 12 per cent sucrose and 77.2 per cent purity. In both of these gran cultura trials on loose alluvial soils, No. 28 gave more satisfactory sugar yield percentages and produced 2 or 3 tons more of sugar per acre than POJ 2878.

At Colonia Esperanza 2.78 acres of Mayaguez 28, first ratoons, harvested Feb. 4-5, 1932, when 10 1/2 months old, yielded 35.1 tons of cane per acre with 16.00 per cent sucrose and 85.53 per cent purity in comparison with 3 acres of BH 10(12) which yielded 23.5 tons of cane per acre, and 4 acres of POJ 2878 harvested Feb. 28 when 12 months old which yielded 43.4 tons of cane per acre with 14.0 per cent sucrose and 83.0 per cent purity. The sugar production of POJ 2878 was 4.92 tons per acre, a yield somewhat better than that of Mayaguez 28, but the latter was cut 1 1/2 months earlier.

#### UPLAND CULTIVATION.

On a dry hillside near Moca, Central Coloso planting, 40 tons of Mayaguez 28 gran cultura, harvested April 21, 1931, when 19 1/2 months old, gave a sucrose of 20.13 per cent and a purity of 90.27 per cent, in comparison with 33 tons of POJ 2725 which gave 16.22 per cent sucrose and 84.62 per cent purity. On a steep hillside at Jayuya, elevation 1500 feet, Mayaguez 28, gran cultura, produced 80 tons per acre on one acre in 1931.

#### MAYAGUEZ 28 CULTIVATION UNDER IRRIGATION.

At Central Mercedita, Ponce, 5.75 acres of Mayaguez 28, gran cultura, harvested December 21, 1931, when 18 months old, produced 77.53 tons of cane per acre with a sugar yield of 10.15 per cent. The most comparable field of BH 10(12) gran cultura harvested January 2, 1932 produced 75.06 tons of cane per acre on 18.75 acres with a sugar yield of 11.00 per cent.

#### DISCUSSION OF PROBABLE ADAPTATION AND QUALITIES BY VARIETIES.

##### MAYAGUEZ 3.

MAYAGUEZ 3 is a very late or non-arowing variety immune to mosaic. It germinates rapidly, trashes easily and remains erect throughout most of the crop season. It is not very resistant to drouth and is only recommended for experimental plantings on irrigated lowland or in areas of heavy rainfall. It will give satisfactory sugar yields similar to those of SC 12/4 but some/lower than BH 10(12). what

##### MAYAGUEZ 7.

MAYAGUEZ 7 is a late-arowing variety immune to mosaic. It gives an excellent germination. It goes down at 8 to 10 months and will not uproot. No. 7 is very drouth-resistant and seems well adapted to non-irrigated lowlands. Under irrigation it has give cane tonnage inferior to both Mayaguez 42 and 63.



## MAYAGUEZ 28.

MAYAGUEZ 28, being more drouth-resistant than SC 12/4, POJ 2725 and POJ 2878, is well adapted to upland cultivation where a 3 or 4 months drouth may be expected during the winter and early spring months. It exceeds POJ 2725 in number of canes per stool and this combined with its very spreading growth habit results in a rapid closing which cheapens cultivation costs; Central Igualdad found in the San Germán valley only one hand weeding necessary on 35 acres of first ratoons of Mayaguez 28 in the spring of 1932. A combination of its prolificness, spreading growth habit, and strong root system which prevents rapid erosion, makes this variety well adapted to steep hillsides. At Jayuya, where the hills are so steep that all cultivation is done by hand, approximately 200 acres are planted to Mayaguez 28. A total of 1190 acres of No. 28 are now under cultivation in the Island, including 190 acres at Central Coloso and at Isabela, 100 acres in the San Germán and Añasco valley plantings of Centrals Igualdad and Eureka, 200 acres at Jayuya, and 40 acres at Central Carmen.

## MAYAGUEZ 42.

MAYAGUEZ 42 also is a very late or non-arrowing variety immune to mosaic. It germinates well and is conspicuous for its rapid emergence. The canes go down at from 8 to 10 months but will not uproot. Leaves are somewhat clinging but they interfere only slightly with trashing. No. 42 is also somewhat susceptible to drouth and is only recommended for trial plantings on irrigated lowlands. In general, No. 42 has given higher sugar yields and cane production than No. 3. With the exception of the experiments at Central Aguirre, No. 42 has compared well with BH 10(12) in sugar yield.

## MAYAGUEZ 63.

This variety is probably the highest tonnage cane of any Mayaguez seedling here discussed. It does not germinate as well as No. 7 or 42 but produces good sized stools of very thick solid canes. Its leaves are tough dark green and drouth resistant. No. 63 will probably do well on either irrigated or non-irrigated lowland. It has thus far ripened later than the other varieties but its juice quality is not well known.

## DESCRIPTION OF SOME OF THE MORE PROMISING MAYAGUEZ SEEDLINGS.

NOTE: These descriptions are not complete and are merely intended for distinguishing these seedlings from varieties now under commercial cultivation in Puerto Rico.

## MAYAGUEZ 3.

MAYAGUEZ 3 is a cinnamon or rusty colored cane with long cylindrical joints. It is conspicuous for fine striations that cover the entire internode. The growth habit is very spreading during the first 4 or 5 months and later strictly erect. The canes are thicker than those of BH 10(12) when grown under irrigation. Buds are long, extend well above the growth ring and become somewhat exserted towards maturity. Leaves are broad and erect with tips long drawn out. Leaf sheaths are hairy but the leaves shed very freely. "Leaf ears" or ligular processes are lacking or very small, less than 1 cm. long. Some hollowing is found in the centers of the cane but less than that found in POJ 2878. Growth cracks are large and often present. No. 3 is less drouth-resistant than either Mayaguez 7 or 63. It is a very late arrower and will not blossom at all except under very favorable conditions. No. 3 is probably unsuited to adverse cultural conditions. Some dry top rot has been observed which may interfere with successful ratooning.

## MAYAGUEZ 7.

MAYAGUEZ 7 produces cylindrical joints of medium length, that is, somewhat longer than those of BH 10(12). The cane girth is slightly less than that of BH 10(12) but develops satisfactorily under irrigation. Wax is almost entirely lacking. Cane color is yellowish green with a maroon red flush. Striations are present but less conspicuous than those of No. 3. Growth cracks are not found. The growth habit is very erect during the first 7 or 8 months after which the canes recline or go down. Buds are triangular, barely exceeding the growth ring. Leaf sheaths are hairy but the leaves shed freely. Leaves are broad, tough in texture, and completely recurved. Leaf tips are recurved and long drawn out. "Leaf ears" or ligular processes are 2-3 cm. long and occur on one side only. The leaf scars are usually hairy. This cane is conspicuous for its rapid early growth and drouth resistance, being superior to BH 10(12) in both respects. It is intermediate between POJ 2725 and BH 10(12) in stooling habit. The germination of No. 7 is excellent. Its foliage is generally quite free from leaf spot and no dry top rot has been observed. It is definitely later than POJ 2725 in arrowing habit.



## MAYAGUEZ 28.

MAYAGUEZ 28 is a yellowish green cane with swollen joints of medium length and thick girth. Buds are long, pointed and definitely exerted towards maturity. Leaf sheaths are hairy but the leaves shed very freely. Growth is very spreading during the first four months, then semi erect until towards maturity when the canes become reclining to recumbent. Leaves are of medium width and semi erect with recurved tips. Mayaguez 28 arrows profusely but later than POJ 2725. Mayaguez 28 is outstanding for its high sucrose content, drouth resistance, and prolific stooling habit. It develops an even larger number of shoots per stool than POJ 2878. In drouth resistance it surpasses both POJ 2725 and SC 12/4. It closes in very quickly, and low cultivation costs may be expected in ratoon crops.

## MAYAGUEZ 42.

MAYAGUEZ 42 is a thick cane with very long straight joints, somewhat staggered. Its cane color is greenish yellow with a purple flush on the upper part of the internodes. Striations are not conspicuous and are confined to the upper half of the internode. Growth cracks are common but often inconspicuous. Buds are firm, round and confined below the growth ring. Growth is semi erect at first and spreading to reclining at 8 or 9 months. Leaves are broad, dark green, and erect to semi erect. Leaf tips are erect and long drawn out. Leaf sheaths are almost entirely free from hairs both on the back and sides. Leaf ears or ligular processes are lacking. The leaves cling somewhat more than those of No. 7. The foliage is generally free from leaf spot or other diseases. In common with No. 7 this variety is extremely vigorous and grows far more rapidly than POJ 2725 during the first 6 months. The young germinating shoots are conspicuous for their rapid emergence.

## MAYAGUEZ 49.

MAYAGUEZ 49 is a cane of medium girth and with very long joints which are entirely covered with wax when young. The color is greenish yellow with rusty blotches on the upper part of the internode. Buds are very long and pointed but not exerted. Striations are inconspicuous. Growth is spreading and very slow during the months of short day length; later on in the summer months growth is very rapid and the canes become semi erect, maintaining this position at maturity. The leaves of No. 49 are very healthy and dark green; they are broad and completely recurved. No difficulty is experienced in trashing. Hairs are present on the leaf sheaths but are not persistent and are seldom found below the top few joints even in young cane. Growth cracks are not present.

## MAYAGUEZ 63.

MAYAGUEZ 63 has light green canes which become yellow towards maturity. Internodes are long and cylindrical. Under irrigation or partial irrigation the canes are very thick, far exceeding those of BH 10(12) or POJ 2878 in this respect. The nodes are swollen. Leaf scars are prominent on all sides. Buds are round, and confined to the growth ring. Growth cracks do not occur. Canes are heavy and solid without hollowing at the center. Striations are confined to the upper third of the internode. Growth is at first semi-spreading, very irregular, and not very promising.

## SUMMARY.

The more promising of the Mayaguez seedlings under discussion at present appear to be in the order listed: Mayaguez 28, 63 and 42. Results in different parts of the Island indicate that several of these seedlings are worthy of inclusion in variety trials. Mayaguez 28, 49 and 7 are recommended for either upland or non-irrigated lowland trials and Mayaguez 28, 3, 42, and 63 for irrigated lowland. Of all these varieties, Mayaguez 28 appears to have the widest range of adaptability. It has given satisfactory results both on sandy alluvial lowland and on dry hill-sides. Planters will do well to await the results of one or more ratoon crops before extending any of these Mayaguez seedlings on a large acreage.



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